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Impact of Aging on Conversational Discourse Cohesion in Tamil-Speaking Neurotypical Adults

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ABSTRACT

Aging affects discourse cohesion, leading to challenges such as repetition, vagueness, and word-finding difficulties. While research has focused on Western populations, there is a lack of studies on Tamil-speaking elderly, emphasizing the need for exploration in this demographic. The study aimed to investigate age-related differences in conversational discourse cohesion among neurotypical Tamil-speaking individuals. This study included 80 Tamil-speaking participants, comprising 40 middle-aged adults (aged 44–59) and 40 older adults (aged 60–80), with an equal number of males and females. Participants engaged in conversational discourse tasks that were video recorded. Discourse cohesion was analysed using the Complementary Procedure for Conversational Discourse Analysis (CPCDA) tool. Results showed that older adults had significant impairments in discourse cohesion ($p \leq 0.05$), including pronoun use, vague expressions, repeated information, and word-finding difficulties, compared to middle-aged adults, with no significant differences in other cohesion domains. Results suggests that age plays a more significant role in discourse cohesion impairments in later adulthood. Assessing discourse cohesion in aging individuals is crucial for the early detection of linguistic decline. These findings

support the integration of discourse analysis into routine clinical evaluations by speech-language pathologists, enabling timely and targeted interventions that help preserve communicative effectiveness and improve the communication quality of life in aging populations.

Keywords: Conversational Discourse; Discourse Cohesion; Aging; Discourse Analysis; Linguistic Decline

1. Introduction

Conversational discourse is one of the most fundamental aspects of human communication, allowing individuals to convey thoughts, exchange information, negotiate meanings, and build social relationships. It extends beyond the mere production of sentences, encompassing the ability to create a coherent flow of ideas across turns and topics. Discourse cohesion refers to the use of linguistic devices that link ideas, sentences, and turns in conversation to create a coherent and unified message[1]. Cohesion encompasses a variety of mechanisms, including referential expressions (pronouns, demonstratives), lexical ties (repetition, synonyms), conjunctions, and ellipsis, which together enable listeners to follow the speaker's intended meaning[2]. Effective cohesion is critical for maintaining clarity, continuity, and comprehensibility in both spoken and written discourse. Age-related cognitive changes, particularly in working memory, attention, and lexical retrieval, can subtly disrupt these cohesive links, leading to errors such as pronoun ambiguity, repetition, or vague sentence planning[3]. By studying cohesion in aging populations, researchers can better understand how normal cognitive aging affects the organization and clarity of discourse, providing insights for both theory and clinical practice.

However, the ability to maintain cohesion in discourse does not remain static throughout the lifespan. Aging is often associated with subtle yet significant changes in both cognitive and linguistic capacities. Cognitive functions such as working memory, attention, processing speed, and executive control have been shown to decline with age, even in healthy older adults[4,5]. Since these functions underlie discourse planning, monitoring, and repair, their decline may reduce the efficiency with which older adults produce cohesive speech. Indeed, previous research has reported that aging is linked to increased use of vague expressions, lexical retrieval difficulties, pronoun misuses, repetition of information, and referential ambiguities-all of which compromise

discourse clarity and coherence[6–8]. While these patterns are not uniform across individuals, they highlight the vulnerability of discourse cohesion to age-related cognitive decline[9].

This issue is particularly pressing in South India, where demographic projections indicate a sharp increase in the aging population. By 2050, nearly 20% of the region's population is expected to be over the age of 60, resulting in a significant shift in the linguistic and social landscape[10]. In Tamil Nadu, a state with one of the largest elderly populations in the country, older adults occupy vital social positions. They often play central roles in intergenerational caregiving, offering financial, emotional, and cultural support to younger family members. Their influence in family decision-making and their role in transmitting cultural practices, traditional stories, and linguistic norms remain profound[11,12]. Thus, any disruption in discourse abilities-particularly those related to cohesion may have far-reaching implications, not only for older adults' personal communication but also for family dynamics, community interactions, and the preservation of cultural knowledge.

Tamil, the language spoken predominantly in Tamil Nadu and among Tamil diasporic communities, provides a unique context for studying discourse cohesion in aging. As a Dravidian language spoken by more than 70 million people worldwide, Tamil is characterized by agglutinative morphology, where grammatical relations and syntactic functions are often expressed through suffixation[13,14]. It is also a topic-prominent language, meaning that discourse tends to be organized around topics rather than subjects, as is the case in many Indo-European languages. Furthermore, Tamil has an elaborate system of honorifics and politeness markers, which play an important role in regulating social relationships and hierarchical dynamics within conversations[15]. These features suggest that discourse cohesion in Tamil is influenced not only by cognitive and linguistic capacities but also by sociocultural expectations and pragmatic norms.

Despite these unique features, much of the existing research on discourse and aging has been conducted in West-

ern contexts, particularly among English-speaking populations[16,17]. English, as a language with comparatively less morphological complexity and a subject-prominent syntactic structure, differs considerably from Tamil. Findings from English-based studies may therefore have limited applicability to Tamil-speaking populations[18]. For instance, referential cohesion in Tamil often depends on discourse-level topic continuity and pragmatic inferences, rather than explicit subject pronouns. Similarly, honorifics and case markers may modulate how speakers maintain or shift cohesion, especially in intergenerational conversations where social status and respect play a role. Investigating discourse in Tamil-speaking elderly is thus necessary to broaden our cross-linguistic understanding of how aging influences cohesion[19].

Another consideration is that while aging has been associated with decli;nes in discourse coherence, research also suggests that certain aspects of discourse remain relatively preserved in later life. Skills rooted in procedural memory, such as formulaic expressions, idiomatic constructions, and routine conversational structures, tend to be maintained even when more demanding cognitive tasks show decline[6,20,21]. For example, older adults may continue to employ well-rehearsed discourse patterns, greetings, or cultural sayings with ease, which may help them mask difficulties in other aspects of conversation. Moreover, older adults are often observed to adopt compensatory communication strategies, such as repeating key points, reformulating utterances, or using circumlocution to maintain discourse flow[22–24]. These strategies may not always enhance precision but can facilitate mutual understanding in naturalistic contexts where listeners are cooperative and familiar with the speaker.

Taken together, these findings suggest a nuanced relationship between aging, cognition, and discourse. Rather than being characterized solely by decline, discourse cohesion in older adults may reflect a dynamic interplay of impairments, preservations, and adaptive strategies. Importantly, these patterns are shaped not only by individual cognitive capacities but also by the linguistic system and sociocultural environment in which communication takes place[25]. For Tamil-speaking adults, where intergenerational communication, pragmatic politeness, and culturally embedded narratives are central, examining cohesion in discourse may reveal insights that are not apparent in Western studies.

Despite the importance of this issue, research on dis-

course and aging in Tamil-speaking populations remains sparse. Few studies have systematically examined how linguistic and cognitive aging interact in non-Indo-European languages, and even fewer have considered the role of sociocultural practices in shaping discourse performance[26]. As a result, there is a significant knowledge gap regarding how Tamil-speaking middle-aged and older adults differ in their ability to produce cohesive discourse, and whether they employ distinct strategies to compensate for age-related challenges. Addressing this gap is essential not only for advancing theoretical models of discourse and aging but also for informing clinical practices in speech-language pathology, where accurate assessment and intervention must be tailored to the linguistic and cultural context of clients[27].

By analyzing naturally elicited conversational discourse, the study aims to capture the complexity of real-world communication while ensuring ecological validity. Specifically, it examines the frequency, types, and accuracy of cohesive devices used across age groups, as well as potential compensatory strategies that older adults may adopt. In doing so, the research contributes to a broader understanding of how aging influences discourse in Tamil and provides cross-linguistic insights into the universality and variability of age-related discourse changes. Ultimately, such work not only enriches theoretical frameworks in psycholinguistics and discourse analysis but also carries practical implications for supporting communicative health and social participation among older adults in Tamil Nadu.

The present study aims to investigate age-related differences in discourse cohesion between middle-aged and older neurotypical Tamil-speaking adults. It was hypothesized that older adults would exhibit impaired discourse cohesion compared to middle-aged adults.

2. Materials and Methods

2.1. Participants

The study recruited a total of 80 native Tamil-speaking neurotypical participants, systematically distributed into two age-based groups: 40 middle-aged adults (aged 44–59 years) and 40 older adults (aged 60–80 years). Within each group, there was an equal gender distribution, comprising 20 males and 20 females, to ensure balanced representation across sexes. In this study, the term neurotypical refers to adults

without neurological, psychiatric, or developmental conditions that could affect cognition, language, or communication. Participants were primarily recruited from urban and semi-urban regions of Tamil Nadu, drawing on local community networks, residential associations, and professional circles. This recruitment approach allowed the sample to reflect the linguistic and sociocultural diversity present in everyday conversational contexts.

Eligibility criteria were carefully defined to ensure that participants' language use could be attributed to age-related factors rather than extraneous conditions. The inclusion criteria required participants to (a) be proficient in Tamil, their primary language of communication; (b) demonstrate normal cognitive functioning; (c) have completed at least a fifth-grade level of formal education, which ensured basic literacy and consistent exposure to formal Tamil usage; (d) present with normal hearing or only mild age-related hearing concerns that did not significantly impede communication; and (e) exhibit stable mental health with no evidence of psychiatric or emotional instability.

The exclusion criteria were equally stringent. Individuals with a history of psychological disorders (such as major depression or schizophrenia), neurological conditions (including stroke, dementia, or Parkinson's disease), or any diagnosed speech, language, or voice disorders were excluded. Additionally, individuals with uncorrected hearing loss, severe visual impairments, or other medical conditions that could interfere with conversational discourse were not considered for participation. These measures ensured the reliability of the dataset and minimized the risk of confounding factors.

Before the commencement of the study, participants were fully briefed about the nature and purpose of the research. The study emphasized voluntary participation, and all participants provided written informed consent. For those with limited literacy, oral consent was obtained in the presence of a witness, ensuring adherence to ethical research practices. The consent process also clarified the use of video recordings, the confidentiality of data, and participants' right to withdraw at any stage without penalty.

2.2. Sample Collection

Discourse samples were collected using semi-structured conversational tasks designed to elicit natural, spontaneous language while maintaining enough structure for cross-participant comparison. Each participant engaged in conversations on two familiar and culturally relevant topics: family and work. These domains were deliberately selected because they represent areas of everyday relevance, enabling speakers to draw on personal experiences, memories, and cultural practices. Conversations around family often elicited narratives about caregiving, relationships, and intergenerational interactions, while discussions on work provided opportunities to talk about occupational roles, responsibilities, and retirement experiences.

Conversations were conducted by a trained native Tamil-speaking examiner who adopted a facilitative, non-directive style. This approach ensured that participants felt comfortable and were encouraged to elaborate naturally, rather than producing rehearsed or task-driven responses. Each conversational session lasted approximately 15–20 minutes, with sufficient flexibility to account for individual differences in speech style and elaboration.

The conversations were conducted either at the participant's residence or workplace, depending on their convenience. This choice of environment was intentional: familiar settings were expected to reduce anxiety and foster authentic conversational behavior. A quiet space with minimal background noise was ensured in every case.

All sessions were video-recorded using a high-resolution digital camera. Video recordings allowed the researchers not only to capture the verbal content but also to preserve non-verbal features such as gestures, pauses, and prosodic variations, which often accompany cohesive strategies in natural discourse. These recordings constituted the primary dataset for subsequent transcription, annotation, and analysis.

2.3. Cohesion Analysis and Coding

The analysis of conversational discourse focused specifically on cohesion. Cohesion was assessed using the Complementary Procedure for Conversational Discourse Analysis (CPCDA), a structured tool designed to provide comprehensive evaluation of cohesion in naturalistic speech [28]. The CPCDA framework identifies a wide range of cohesive categories and errors, allowing for fine-grained analysis of how speakers maintain or lose logical continuity in conversation.

To facilitate detailed annotation, all video samples were

processed using ELAN 6.8 (Eudico Linguistic Annotator), a specialized software widely used in linguistic research for multi-layered discourse annotation[29]. Each video was transcribed, and then cohesion-related features were coded in real time. The categories of cohesion with their descriptions are outlined in **Table 1**.

Table 1. Cohesion categories and their descriptions.

S.No	Cohesion	Description
1	Abrupt Interruption (AI)	Sudden breaks in discourse where cohesion was lost.
2	Repeated Words (RW)	Redundant repetitions that did not contribute to discourse clarity.
3	Repeated Information (RI)	Reiteration of the same content without adding new meaning.
4	Inconsistent Use of Referential Pronouns (IU)	Ambiguous or incorrect references to participants or objects.
5	Contradiction Errors (CE)	Statements that conflicted with previously expressed ideas.
6	Relation Errors (RE)	Utterances that were irrelevant or poorly connected to the preceding context.
7	Expresses Ideas Vaguely – Confusing Information (EVM-CI)	Overgeneralized or unclear statements that hindered interpretation.
8	Expresses Ideas Vaguely – Insufficient Information (EVM-II)	Responses lacking adequate detail for comprehension.
9	Expresses Ideas Vaguely – Sentence Planning Difficulties (EVM-DP)	Hesitations or incomplete constructions suggesting impaired planning.
10	Grammatical Errors – Article Use (EVM-IA)	Omission, substitution, or misuse of articles affecting grammatical accuracy.
11	Word-Finding Difficulties (SW)	Pauses, fillers, or substitutions indicating lexical retrieval problems.
12	Paraphasia (PAR)	Semantic or phonemic substitutions altering intended meaning.
13	Reformulates Sentences or Words (RSW)	Revisions or rephrasings made to repair cohesion.
14	Syllabic False Starts (FS)	Premature initiation of syllables or words that were immediately abandoned or corrected.

Each instance of a cohesion-related feature was assigned a unique code in ELAN, marking its exact time stamp and corresponding discourse context. This systematic annotation allowed the researchers to quantify the frequency of each cohesion category and examine patterns across age groups.

The coding procedure emphasized both accuracy and consistency. Multiple passes of annotation were conducted to minimize oversight, and ambiguities in coding were resolved through discussion among trained raters.

2.4. Reliability

Reliability was a central concern in this study, given that discourse analysis involves subjective judgment in identifying and coding cohesion features. To establish the dependability of the coding process, 25% of the dataset was randomly selected for both inter-rater and intra-rater reliability checks. Random sampling ensured that the reliability estimates were representative of the entire dataset rather than being limited to a particular participant group or discourse type.

Two independent speech-language pathologists (SLPs) with advanced training and prior experience in discourse and aphasia research were engaged for this purpose. Both raters were familiar with the Complementary Procedure for Conversational Discourse Analysis (CPCDA) framework and had prior exposure to ELAN annotation, which minimized variability due to unfamiliarity with the tools. Prior to coding, the raters participated in a calibration session where coding guidelines were reviewed, ambiguous examples were discussed, and consensus strategies were established. This preparatory phase further enhanced consistency.

Inter-rater reliability measured the extent to which the two SLPs agreed when coding the same set of discourse samples. A high level of agreement here indicated that the

coding scheme was objective and replicable across raters. Intra-rater reliability was assessed by having each rater recode a subset of their assigned data after a two-week interval. This time gap minimized recall bias and ensured that consistency reflected stable application of the framework rather than memory of earlier decisions.

Inter-rater and intra-rater reliability for CPCDA coding were assessed using the percentage agreement method, calculated as: total agreements/(total agreements + total disagreements) × 100. Inter-rater reliability values ranged from 87% to 93%, and intra-rater reliability values ranged from 85% to 95% across cohesion categories. Both sets of values exceeded the commonly accepted 80% benchmark for discourse analysis[30], indicating strong consistency in the coding process.

The robust reliability outcomes can be attributed to several factors: the structured nature of the CPCDA framework, the use of time-aligned ELAN software which reduced annotation ambiguity, and the expertise of the raters. Together, these elements ensured that the analysis was not only systematic but also reproducible, thereby strengthening the validity of the study's findings.

2.5. Statistical Analysis

The coded data were analyzed using SPSS (version 22). The primary objective was to determine whether discourse cohesion patterns differed significantly between middle-aged and older adult groups. Chi-square tests were applied to examine group-wise differences in the frequency of cohesion errors, an appropriate choice for categorical data. Descriptive statistics (frequencies, percentages, and means) were generated to summarize the distribution of cohesion features. Effect sizes were additionally noted to interpret the magnitude of differences. This combination of descriptive and inferential statistics offered a clear view of age-related trends while ensuring statistical rigor.

3. Results

The present study examined age-related differences in conversational discourse cohesion among middle-aged and older neurotypical Tamil-speaking adults. The findings are presented in terms of demographic characteristics, statistical comparisons of discourse cohesion categories, and detailed qualitative observations of cohesion error patterns.

3.1. Participant Characteristics

Descriptive statistics of participants' demographic variables are provided in **Table 2**. The middle-aged group had a mean age of 48.83 ± 4.10 years, while the older adult group had a mean age of 67.28 ± 5.16 years. Gender distribution was equal, with 20 males and 20 females in each group. Educational attainment was comparable, with mean years of education of 10.58 ± 3.43 for the middle-aged group and 10.31 ± 3.30 for the older group. All participants were native Tamil speakers, and although some reported functional bilingualism in English, Tamil consistently remained their dominant language. Cognitive screening further confirmed intact functioning, with mean MoCA scores of 27.39 ± 1.37 in the middle-aged group and 26.55 ± 0.87 in the older group. Psychological status was stable across groups, with mean GHQ scores of 10 ± 2.17 for the middle-aged group and 11 ± 1.98 for the older group. Screening confirmed that all participants demonstrated normal cognitive functioning for their age, stable psychological status, and no major medical conditions affecting communication. Importantly, there were no statistically significant differences between the groups on demographic or baseline variables, suggesting that age was the primary distinguishing factor.

These findings ensured that observed differences in discourse cohesion could be attributed with greater confidence to age-related linguistic changes, rather than demographic or cognitive confounds.

Table 2. Demographic details of middle and older aged participants.

	Middle Age	Older Age
Age (years)	48.83 ± 4.10	67.28 ± 5.16
Gender (M:F)	20:20	20:20
Education	10.58 ± 3.43	10.31 ± 3.30
MOCA	27.39 ± 1.37	26.55 ± 0.87
GHQ	10 ± 2.17	11 ± 1.98

Mean ± SD. MOCA, Montreal Cognitive Assessment; GHQ-12, General Health Questionaries-12.

3.2. Group Comparisons of Discourse Cohesion

The chi-square analyses revealed clear group differences in specific cohesion domains, as summarized in **Table 3**. Four cohesion categories exhibited statistically significant age effects ($p \leq 0.05$): Repeats Information (RI), Inconsistent Use of Referential Pronouns (IU), Expresses Ideas Vaguely due to Sentence Planning Difficulties (EVM-DP), Word-Finding Difficulties (SW). In each of these domains, older adults demonstrated a higher frequency of errors compared to middle-aged participants, indicating greater challenges in maintaining coherent discourse.

By contrast, no significant differences emerged between the groups for several other cohesion domains, including Abrupt Interruption (AI), Repeats Word (RW), Contradiction Errors (CE), Relation Errors (RE), Expresses Ideas Vaguely – Confusing Information (EVM-CI), Expresses Ideas Vaguely – Insufficient Information (EVM-II), Grammatical Errors in Article Use (EVM-IA), Reformulations (RSW), and Syllabic False Starts (FS). This suggests that some discourse skills remain stable across age groups, particularly those supported by well-preserved procedural memory and routine conversational strategies.

3.3. Discourse Cohesion Errors in Tamil Conversational Discourse

To enrich the empirical findings with qualitative evidence, a few representative excerpts of participants' conversational data are provided in **Table 4**. Example is presented in Tamil, followed by its English equivalent and an explanation of the associated cohesion error. This bilingual format ensures accessibility for an international readership while preserving the authenticity of the original discourse. The excerpts illustrate a range of cohesion impairments, including abrupt interruptions, inconsistent pronoun use, repetitions, contradictions, and vague or incomplete information. By grounding the identified error categories in actual participant speech, these data highlight how cohesion breakdowns manifest in real-time communication. Such qualitative insights are essential for understanding the challenges faced by Tamil-speaking adults in maintaining discourse cohesion and for informing culturally and linguistically relevant intervention strategies.

Table 3. Chi-square test results for Conversational cohesion discourse between middle and Older age group.

Cohesion	Middle Age (Min-Max)	Older Age (Min-Max)	X^2 Value	df	Phi Value	*p*-Value
Abrupt interruption (AI)	0–1	0–1	1.053	1	0.12	0.305
Repeats word (RW)	0–3	0–3	5.858	3	0.27	0.119
Repeats information (RI)	0–3	0–3	7.371	3	0.30	0.044*
Inconsistent use of referential pronouns (IU)	0–0	0–1	3.117	1	0.28	0.050*
Contradiction errors (CE)	0–1	0–1	0.346	1	0.06	0.556
Relation errors (RE)	0–1	0–1	0.721	1	0.09	0.396
Expresses ideas vaguely – confusing information (EVM-CI)	0–0	0–1	2.051	1	0.16	0.152
Expresses ideas vaguely – insufficient information (EVM-II)	0–1	0–1	0.827	1	0.10	0.363
Expresses ideas vaguely manner – sentence planning difficulties (EVM-DP)	0–1	0–2	8.563	2	0.32	0.014*
Grammatical errors – article use (EVM-IA)	0–1	0–1	1.920	1	0.12	0.166
Word-finding difficulties (SW)	0–1	0–1	5.165	1	0.25	0.023*
Paraphasia (PAR)	-	-	-	-		-
Reformulates Sentences or Words (RSW)	0–1	0–3	1.119	2	0.11	0.57
Syllabic false start (FS)	0–1	0–2	3.327	2	0.20	0.189

*$p \leq 0.05$ indicate significance Paraphasia (PAR): chi-square test could not be performed due to no variation or errors in data.

Table 4. Sample excerpts of discourse cohesion errors in Tamil conversational discourse.

Conversational Discourse Cohesion	Example in Tamil	English Translation	Explanation
Repeats Word (RW)	"Enga kudumbam periya kudumbam … kudumbam."	"Our family is a big family … family."	The participant repeats "family" unnecessarily.

Table 4. *Cont.*

Conversational Discourse Cohesion	Example in Tamil	English Translation	Explanation
Repeats Information (RI)	"Enga veetil ellarum nanraga irukkanga. Ellarum nanraga irukkom."	"In my house, everyone is doing well. Everyone is doing well."	The participant repeats the idea of everyone being well without adding new information.
Inconsistent Use of Referential Pronouns (IU)	"Avanga nalla irukanga, avan sonnanga …" *(unclear who "avanga" and "avan" refer to in the family context)*	"They are good, he said ..."	The listener cannot discern who the participant is referring to, causing confusion.
Contradiction Errors (CE)	"En veetukarar romba busy-anavaru … avar velai illama irukirar."	"My husband is very busy ... he is unemployed."	The participant first states that their husband is busy and then contradicts by saying he is unemployed.
Syllabic False Start (FS)	"En ak … appa kudumbathukku miga anbanavar."	"My si … dad is very dear to our family."	The participant starts with an incorrect syllable ("si …") before restarting.

3.4. Patterns of Discourse Cohesion Errors

A more detailed analysis of the conversational samples revealed qualitative patterns in error distribution, highlighting the specific nature of age-related discourse disruptions.

3.4.1. Repetition of Information (RI)

Older adults frequently repeated information, sometimes within the same conversational turn and at other times across multiple turns. These repetitions often served as an unconscious compensatory mechanism, helping speakers to maintain conversational flow when retrieval difficulties arose. However, excessive repetition led to redundancy and diminished the efficiency of communication. For example, older participants occasionally restated the same family event multiple times, using slightly different wording but without adding new information.

3.4.2. Inconsistent Use of Referential Pronouns (IU)

A prominent finding was the inconsistent or ambiguous use of referential pronouns by older adults. Tamil, being a topic-prominent language, often allows pronouns to be dropped when context makes the referent clear. However, older speakers sometimes used pronouns incorrectly or switched referents mid-discourse, leaving listeners uncertain about whom or what was being discussed. This breakdown in referential cohesion affected the clarity of narratives and was a frequent source of miscommunication.

3.4.3. Word-Finding Difficulties (SW)

Word-finding difficulties were common in older participants. These manifested as long pauses, substitution of target words with nonspecific fillers (e.g., "*andha vishayam*" [that thing]), or circumlocutions. Such strategies allowed the speaker to continue talking but often at the cost of precision and clarity. This aligns with broader literature linking lexical retrieval problems with aging-related declines in working memory and processing speed.

3.4.4. Sentence Planning Difficulties (EVM-DP)

Aging also appeared to affect higher-order planning skills in discourse. Older adults displayed vague or incomplete expressions of ideas when attempting to construct complex sentences. Sentences often lacked clarity, trailing off without completion, or shifting abruptly to unrelated details. This pattern suggested difficulties in organizing and sequencing linguistic material during real-time speech production. The impact was most evident in discussions of work-related experiences, where older participants occasionally struggled to narrate sequential events coherently.

3.4.5. Other Observed Features

Although not statistically significant between groups, certain errors were still noteworthy: Abrupt interruptions (AI) occurred occasionally in both groups, often reflecting conversational style rather than cognitive decline. Repeats Word (RW) errors, while present, were typically low in fre-

quency and did not significantly disrupt cohesion. False starts (FS) were observed in both age groups, often followed by immediate self-corrections, suggesting intact monitoring processes. Reformulations (RSW) were used by both groups as an adaptive strategy to clarify or repair utterances, reflecting resilience rather than impairment.

3.5. Summary of Group Differences

Overall, the results demonstrated that aging was associated with specific, rather than global, declines in discourse cohesion. Older adults were particularly vulnerable to errors involving lexical retrieval, sentence planning, and referential cohesion. At the same time, several cohesions domains-such as grammatical accuracy, relation errors, and reformulations remained relatively stable.

This pattern indicates that while aging affects certain cognitively demanding aspects of discourse, older adults may continue to rely on preserved skills and adaptive strategies to maintain communication. For example, repetition and circumlocution, though technically errors, also served as mechanisms for keeping conversations active and engaging.

3.6. Implications of Findings

The findings underscore the nuanced nature of discourse changes with aging. Rather than reflecting a whole-sale decline, discourse in older adults appears to represent a complex balance between vulnerability and resilience. Specifically:

i. Vulnerabilities: Age-related decline in working memory and lexical retrieval likely contributed to difficulties with sentence planning, pronoun use, and word-finding.

ii. Resilience: Preserved procedural memory supported the continued use of grammatical structures, false-start repairs, and reformulations.

iii. Adaptive Strategies: Repetition, vague wording, and circumlocution reflected compensatory attempts to maintain fluency, even if at the expense of precision.

From a clinical perspective, these findings suggest that interventions for older adults should not only target deficits (e.g., training in referential clarity) but also harness adaptive strategies that remain effective in real-life communication.

4. Discussion

The present study examined conversational discourse cohesion in middle-aged and older neurotypical Tamil-speaking adults and revealed several important findings about how aging influences discourse organization. Specifically, older adults demonstrated increased occurrences of Repeats Information (RI), Inconsistent Use of Referential Pronouns (IU), Expresses Ideas Vaguely due to Sentence Planning Difficulties (EVM-DP), and Word-Finding Difficulties (SW) when compared to middle-aged adults. These patterns highlight subtle but consistent changes in discourse cohesion as a function of aging, even in individuals who perform within the normal range on cognitive and psychological screening measures. Thus, while gross cognitive impairment was ruled out in this study, the observed cohesion errors underscore the nuanced effects of normal aging on discourse production[6].

Aging is typically accompanied by declines in various cognitive processes, most notably working memory, attentional capacity, and executive functions-domains that are crucial for maintaining coherent and cohesive discourse[4,5,31]. Working memory, for instance, plays a key role in keeping track of ongoing conversational topics, integrating new information, and maintaining referential clarity across turns. Declines in attentional resources make it harder for older adults to monitor their speech output and ensure that it aligns with previously stated content[32]. These deficits are reflected in increased repetition of information and vague or incomplete sentence planning, as demonstrated in this study. Similarly, word-finding difficulties, a hallmark of aging-related language decline, often lead to the use of placeholders, circumlocution, or vague expressions, which ultimately reduce the overall cohesion of discourse[33].

The findings of this study are consistent with a growing body of research on age-related changes in discourse cohesion. Previous studies have similarly reported that older adults demonstrate differences in cohesion performance compared to middle-aged adults across a variety of discourse tasks[16,34,35]. In particular, subtle declines in executive functioning including attentional control and cognitive flexibility have been implicated in reduced discourse quality[6,7]. Our results echo these findings, as older adults in the present study often displayed vague sentence structures and difficulty in selecting precise lexical items, leading to less coherent com-

munication. Moreover, referential ambiguity and pronoun errors (IU) were observed with greater frequency in the older group. This observation aligns with prior research showing that maintaining referential clarity is particularly vulnerable to aging, given its reliance on attentional monitoring and the ability to keep track of multiple discourse entities simultaneously[8,36].

Interestingly, some aspects of discourse cohesion remained stable across the two age groups. For example, there were no significant differences in Grammatical Errors – Article Use (EVM-IA) and Syllabic False Starts (FS). These findings suggest that grammatical abilities, which are largely procedural and heavily reliant on long-term memory systems, may be relatively resistant to aging-related decline[6,20,21]. This supports the broader notion that while aging negatively impacts controlled, resource-demanding processes such as lexical retrieval and sentence planning, it leaves automatized language functions relatively intact[37]. From a clinical perspective, this preservation of grammatical structure is reassuring, as it indicates that older adults retain core syntactic competence, even in the presence of broader cognitive decline.

Another important finding was the absence of significant differences in several cohesion domains, such as Abrupt Interruption (AI), Repeats Word (RW), Contradiction Errors (CE), Relation Errors (RE), and Expresses Ideas Vaguely – Insufficient Information (EVM-II). One explanation is that conversational discourse, as opposed to structured tasks like narrative retelling or expository discourse, is inherently dynamic and interactive. This naturalistic setting allows older adults to employ adaptive and compensatory strategies, such as repetition, reformulation, or pragmatic markers, to maintain conversational flow[22,38,39]. For example, repeating a word or reformulating an idea may not necessarily signal a deficit, but rather a strategic attempt to enhance listener comprehension or to buy time during lexical retrieval. These strategies may function as protective mechanisms, enabling older adults to sustain effective communication despite underlying cognitive challenges[23,24,40].

The cultural and linguistic context of the study is also significant. Tamil, as a Dravidian language, relies heavily on contextual and pragmatic cues rather than overt grammatical markers for cohesion[13]. This pragmatic richness may partially buffer the effects of aging on discourse, as speakers can rely on shared cultural understanding and contextual inference rather than explicit cohesive devices. Additionally, conversational norms in Tamil often tolerate or even value repetitions and elaborations, which might influence the interpretation of cohesion errors in cross-linguistic research[15]. For instance, what may be coded as "repetition" in English discourse analysis might serve a pragmatic or emphatic function in Tamil, thus complicating the distinction between error and strategy.

The defined age ranges in the study (middle-aged: 44–60 years; older: 60–80 years) also represent transitional periods in the trajectory of cognitive aging. Middle age is typically marked by relatively preserved cognitive functions, whereas older adulthood often introduces more noticeable changes in processing speed, lexical access, and working memory[41]. The significant differences observed in RI, IU, EVM-DP, and SW therefore highlight how even non-pathological cognitive aging can subtly alter discourse cohesion. Importantly, these findings should not be interpreted as indicative of clinical impairment but rather as reflective of normal aging processes[42]. Recognizing this distinction is critical for clinicians, as it helps differentiate between typical age-related discourse changes and those that may signal early pathological decline, such as Mild Cognitive Impairment (MCI) or Alzheimer's disease.

From a practical perspective, the results of this study have several implications. First, they suggest the need for age-sensitive discourse assessment tools that can capture subtle cohesion deficits in everyday communication[43]. Traditional assessments often focus on sentence-level grammar or single-word tasks, which may miss the nuanced discourse-level changes revealed here. Second, these findings underline the importance of communication support strategies for older adults, such as encouraging the use of clear referential markers or teaching compensatory strategies to manage word-finding difficulties. Such approaches may help maintain communicative effectiveness and social participation, both of which are vital for healthy aging.

Examining these findings within a cross-linguistic perspective highlights both universal and language-specific aspects of discourse aging. Comparative studies suggest that while age-related declines in cohesion, such as word-finding difficulties, repetition, and referential ambiguity, are observed across languages, the manifestation and frequency of

specific errors can vary according to linguistic structure and discourse norms[4,44]. For example, languages with rich pragmatic and contextual cues, such as Tamil, may allow older speakers to compensate for lexical or planning deficits more effectively than languages that rely heavily on overt grammatical markers. These cross-linguistic differences have direct clinical implications for speech-language pathologists working in multilingual or culturally diverse settings. Assessments and interventions must account for both the cognitive and language-specific mechanisms underlying discourse cohesion, emphasizing strategies that leverage preserved linguistic and pragmatic resources. Incorporating bilingual or multilingual discourse samples in evaluation and therapy can enhance ecological validity and ensure interventions are culturally and linguistically appropriate, ultimately supporting effective communication in aging populations.

Future research should build on these findings in several ways. One important direction is to extend this line of inquiry to non-neurotypical populations, such as individuals with Mild Cognitive Impairment, Alzheimer's disease, or post-stroke aphasia. Examining discourse cohesion in these groups would help disentangle the effects of normal aging from those associated with clinical conditions, thereby enhancing both diagnostic accuracy and intervention planning. Additionally, incorporating a wider variety of discourse tasks, such as storytelling, expository discourse, and picture description, would help clarify whether task demands modulate the frequency and type of cohesion errors. For example, structured tasks that require sustained topic maintenance may reveal greater age-related difficulties than free-flowing conversation. Additionally, employing neuroimaging and cognitive profiling techniques could provide deeper insight into the neural correlates of discourse cohesion, particularly in relation to working memory, attention, and executive functioning. Cross-linguistic studies comparing Tamil with Indo-European languages could also reveal whether the observed patterns are universal or language-specific, thereby broadening the theoretical understanding of discourse aging. Finally, future work might consider gender-related differences, given evidence that men and women may employ distinct discourse strategies as they age.

This study contributes to the growing literature on discourse and aging by highlighting specific cohesion domains that are vulnerable to normal aging, while also identifying linguistic functions that remain resilient. The observed difficulties with repetition, referential pronouns, vague sentence planning, and word-finding emphasize the impact of cognitive decline on discourse cohesion, yet the preserved grammatical and procedural aspects suggest a complex interplay between vulnerable and resilient language systems. By situating these findings within both the cognitive and cultural-linguistic context of Tamil speakers, the study underscores the importance of a nuanced, context-sensitive approach to understanding discourse in aging populations.

5. Conclusions

This study offers important insights into how conversational discourse cohesion is shaped by the aging process in a neurotypical Tamil-speaking elderly population. The findings indicate that while older adults demonstrated greater difficulties in certain domains of cohesion such as maintaining referential clarity, avoiding repetitions, and managing word-finding challenges-they also employed adaptive strategies to sustain meaningful communication. This highlights that aging is not merely characterized by decline but also involves compensatory mechanisms that help preserve interactional effectiveness in everyday discourse.

A notable strength of the study is its focus on conversational discourse in a naturalistic context, rather than relying solely on structured or experimental tasks. This approach allowed for a more ecologically valid understanding of how older adults communicate in real-life situations. Moreover, the findings underscore the role of cultural and linguistic context, as discourse strategies among Tamil speakers may differ from those reported in studies of other languages. This emphasizes the need for cross-linguistic research to capture the full diversity of aging-related discourse changes.

The implications of this work extend to both research and clinical practice. By identifying domains of cohesion most vulnerable to aging, the study provides a foundation for differentiating between normal age-related changes and pathological communication decline. Furthermore, it underscores the necessity of early and targeted interventions aimed at maintaining effective communication skills, which are vital for social participation and quality of life in older adults. Overall, this study contributes to a deeper and culturally grounded understanding of aging and discourse.

Author Contributions

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Institutional Review Board Statement

The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the Institutional Ethics Committee of SRM University (Ethical Clearance Number: 8498/IEC/2023; dated on 25.01.2023).

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Data Availability Statement

The data presented in this study are not publicly available due to ethical restrictions.

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Conflicts of Interest

The authors declare no conflict of interest.

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